



## GSM Location Reporting & Tracking Platform (LRTP)



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## 1.0 Introduction

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The solution described is referred to as the Location Reporting & Tracking Platform, or LRTP. The facility to provide Location Interrogation of GSM mobile phones has already been successfully proven and utilized for some time. For the solution to be truly effective, sustaining and to provide a quality of service at critical times will require CLIENT to provide, or otherwise formally arrange, access to certain data and the ability to implement suitable hardware, software and services with 1 (one) local GSM operator. This proposal describes the primary components and services that are required to enable the solution.

It is also important to note that the platform alone is not the sole element to deliver the quality results that are expected. It should be clear from earlier presentations and supporting introductory documents that this solution is not a “black-box” solution where the equipment alone needs to be procured or utilised. The platform will require the formal and legal access to enable the interrogation of each of the local GSM Service Providers. It is assumed that CLIENT has the authority and mandate to request such permanent access from both the primary Host Operator, in which the special equipment is installed or connected to, plus the other GSM Operators’ relevant corporate entities. In addition to the formal access, the complete and correct raw cell data is required to be available to which it shall be supplemented by additional information, standardized into a common format, and maintained by suitably qualified and experienced telecommunication engineers. Periodically, as the GSM networks continue to expand, it is imperative that the LRTP database is continuously updated and managed.

The document describes therefore not just the hardware & software and implementation service, but also the recommended on-going services that will be required to ensure the system delivers both the return on investment and the quality of service expected.

# TECHNICAL DESCRIPTION

## 2.0 Scope of the Location Reporting & Tracking Platform

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The Location Reporting & Tracking Platform (LRTP) to be implemented is that covering the GSM networks in the area required. The purpose of this platform is to provide CLIENT with a facility to locate and report the vicinity location of a GSM device (i.e. mobile phone).

The LRTP facility shall enable suitably authorized users to designate “targets”, to make queries as to the location of, and have the result reported both in text and overlaid on a digital map.

The following sections summarize in short the functionality and capabilities of the **complete** LRTP platform. In the thereafter following Commercial section, 1stWAP proposes the **basic system and platform configuration** to CLIENT.

## 3.0 Overview of Location Reporting & Tracking Platform

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The platform can be defined as having two distinct primary sub-systems being:

### Location Unit

This component comprises the platform’s hardware and supporting software that enables the interface to the Signaling System No. 7(SS7).

### Location Suite

This component comprises the application software & the management tools.

The scope and capabilities of the proposed platform are summarized briefly as follows:

### **A) Location Unit (LU) :**

- The basic Location Unit includes:
  - Up to 4 x SS7 Signaling links (Time Slots) per unit
  - Up to 20 location queries per second
  - 10/100 Ethernet connectivity
  - Software Interface to Location Suite
  - API Interface for 3rd party applications
  - SS7 interface for location requests and location information provisioning over SS7

- White-list authorization feature for location queries
- Basic location request and location status logging
- Provisioning of raw location data (such as IMSI, MSC, LAC, Cell-ID, Subscriber Status, Location Age)
- Integrated database functionality for information such as Longitude/Latitude, MSC-/Cell-Name etc

## **B) Location Suite (LS):**

Web interface front-end for:

Location Interface:

- Graphical display of current location for single/multiple target(s)
- Graphical display of historical location information
- Report display/download for historical location information
- Map Navigation interface engine
- Alarm Information
- Target Location Administration for:
  - Location Scheduling
  - Target – User visibility
- User Account Administration
- GSM and GPS configuration

SMS Broadcasting Interface: (See MobileBroadcast below)

- SMS Broadcasting Interface
- Broadcasting Scheduler
- Destination Phone Book
- Destination Import From File
- SMS Delivery Status Reporting
- SMS Reply reporting

On-Demand Location Requests

- SMS MO Engine for Location Requests from the field
- White/Black listing of querying mobile phones
- Mapping from Cell ID to textual location

Location Engine

- Location Scheduling Engine
- Location Routing Engine
- Location Result and Alarms processing Engine
- Location GPS interface
- Location GSM interface

SMS Broadcasting Engine

- SMS Scheduling Engine

- SMS Routing Engine
- SMS Delivery Status and Reply Engine
- Spoofing capability (create your own "Sender" ID)

Database:

- Administrator Data
- User Data
- Service Data
- Operations Data
- Map Data

General

- Multiple source Logging and DB storing of information and commands
- System configuration, monitoring and maintenance capability
- Backup and Archiving capability

- **Network Features:**

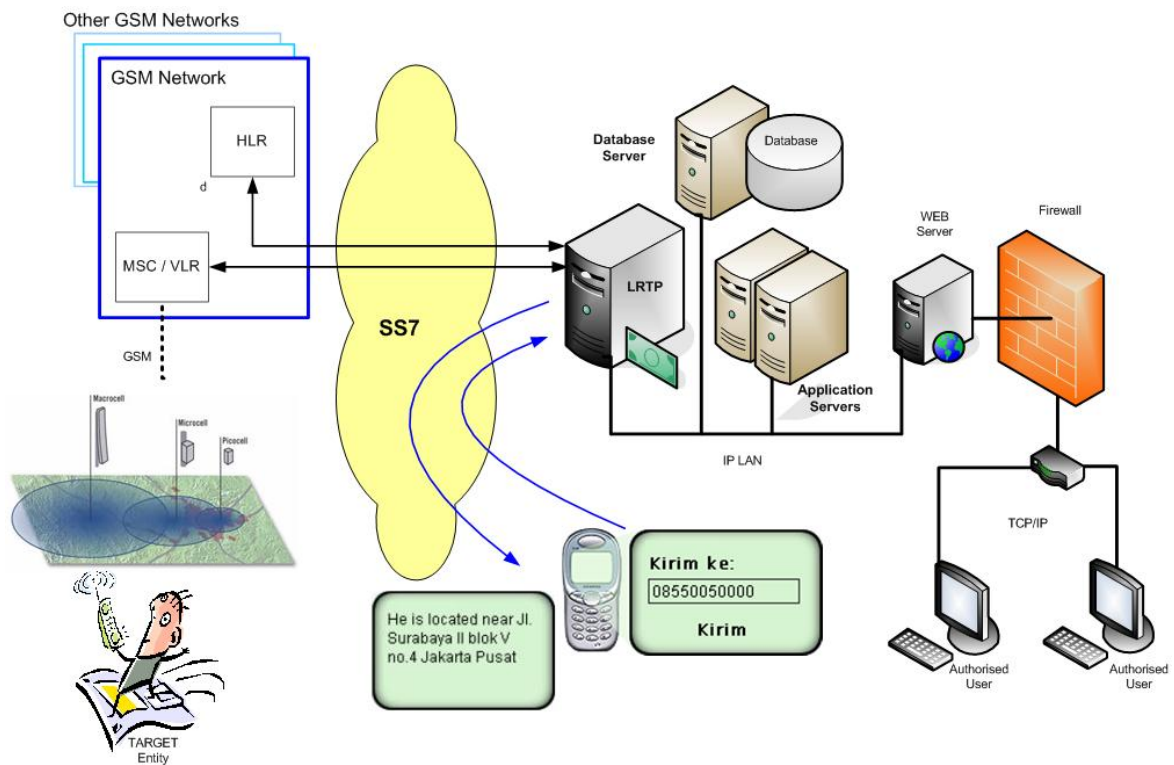
- Technical setup for SS7 and iSMSC access. (SS7 links and IP connectivity as defined in "**Connectivity with local GSM Service Provider**" below).

- **Support Services**

- Technical Support
- Email and Instant Messenger-based User Help
- 24 hours Operations Hotline Support

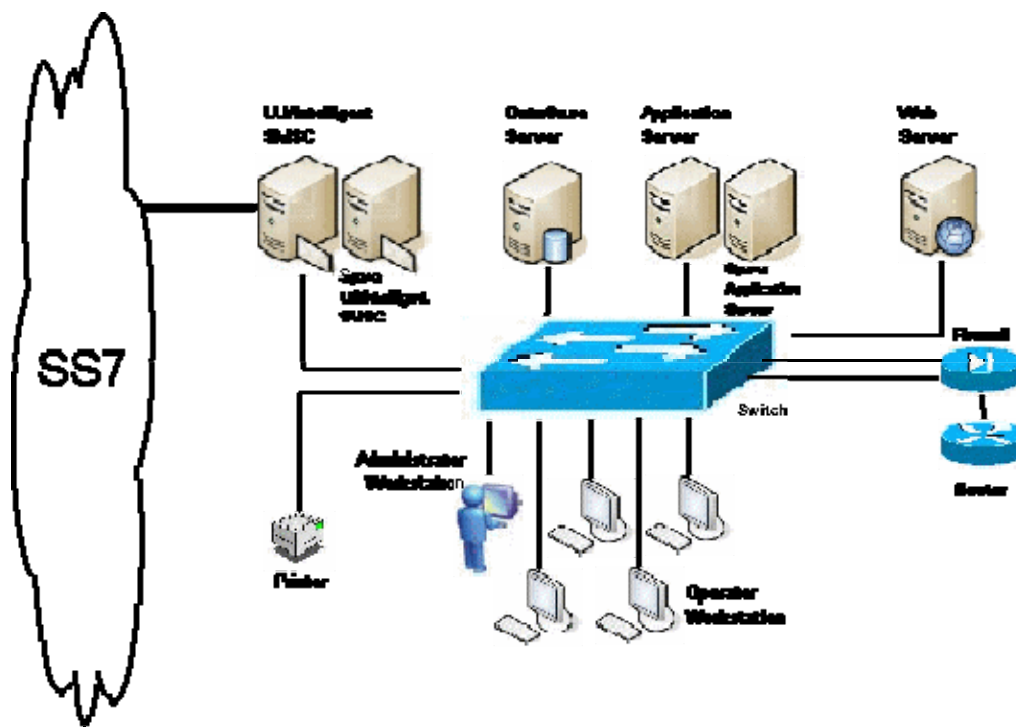
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## Schematic showing relationship between key system components and users

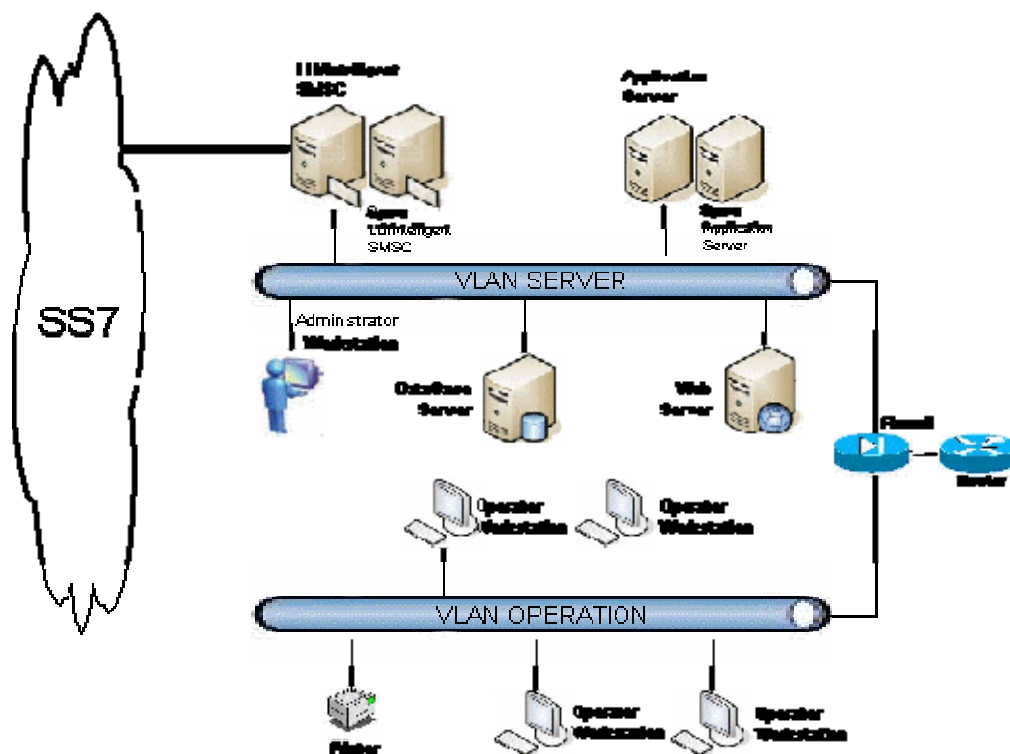


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## Schematic of the physical networked Equipment



## Schematic of the logical network setup





### 3.1 Location / Cell Data

The location data required by the LRTP includes LAC and Cell ID, sector and longitude and latitude data. This data is partially available from the GSM Service providers, such as the LAC and Cell ID, but will require supplementary addition of the global co-ordinates and readable names of locations.

This comprehensive data is used by the platform to overlay location identification and animated tracking of time-based reports. The quality of the data is imperative to the successful operation of the platform and requires periodic maintenance as new BTS/Cell network infrastructure is progressively added and upgraded by GSM providers. This means that CLIENT has to make arrangements with the GSM Network providers in order to get updates as soon as the network planning concerning Cells has changed.

In order to provide the full service functionality to delivery the desired output, 1rstWAP requires the following minimum set of data for each GSM Cell. 1rstWAP action is to process, improve and implement these data sets in the LRTP:

Component	Sample
LAC	1000
CELL_ID	10111
Type	Sector
Cell Diameter [m]	212
Cell Centre [m]	106
Azimuth	0
Site Identifier	Wien
Longitude	16
	25
	15.59
	E
Latitude	48
	11
	9.27
	N
Altitude	
LONG_SHAPE	16,42086
LAT_SHAPE	48,18773
Textual Name	<Text Description of the Cell
Comment	<Additional Data>

All coordinates have to be provided in WGS84 long/lat format without projection and rotation.

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### 3.2 Single MSISDN Location Check (FastTrax)

**FastTrax** is the name used by 1stWAP to describe the single entry location query of a particular mobile phone or GSM SIM card enabled device. The FastTrax module is a simple to use, single entry facility that allows the operator to enter a single MSISDN and enact a single location check. These requests can be initiated directly from the FastTrax web-based application, from a registered (qualified) mobile phone (see **FastTrax-MO** below) or from the LRTP server console.

(Entry Section)

- The "target" mobile MSISDN (hand phone number) is entered in the relevant field.
- Options exist for the selection of the query type; ATI (Any Time Interrogation) or PSI (Provide Subscriber Information). ATI is the default setting. PSI involves "forcing" a paging (via type zero SMS) to the hand phone which will result in an update of the HLR.
- The result of the query will provide the detailed screen such as that shown on the next page

(Remainder of page intentionally left blank)

**FASTTRAX**  
GSM Location Interrogation

Thu 15-11-2007 14:29:34 User: test Logout

Locate Schedule History

**Entry**

HP Number : +6285691053710  
Alias :  
Query Method : ☐ ATI ☒ PSI

Locate

**Target Vital Information**

Location Address

Jl. Kapt. Tendean 24, ^Radiant  
Kec. Mampang Prapatan, Kel. Pela Mampang  
Jakarta - 12720  
INDONESIA

Phone Status : Idle  
As at : 2007-11-15 14:23

**Telco Data**

Home Country / Operator : Indonesia / Indosat-IDNIM  
Roaming Country / Operator : Indonesia / Indosat-IDNSL  
MSC GT, Name : +628160941000, Jakarta -MJK14(3G)  
Cell Reference : 510.1.1011.46812  
Azimuth (degree from North) : 120  
Sector Radius (meters) : 0

**Mapping**

Cell Location  
Map View Aerial View  
Latitude Longitude  
-6.2405, 106.8195

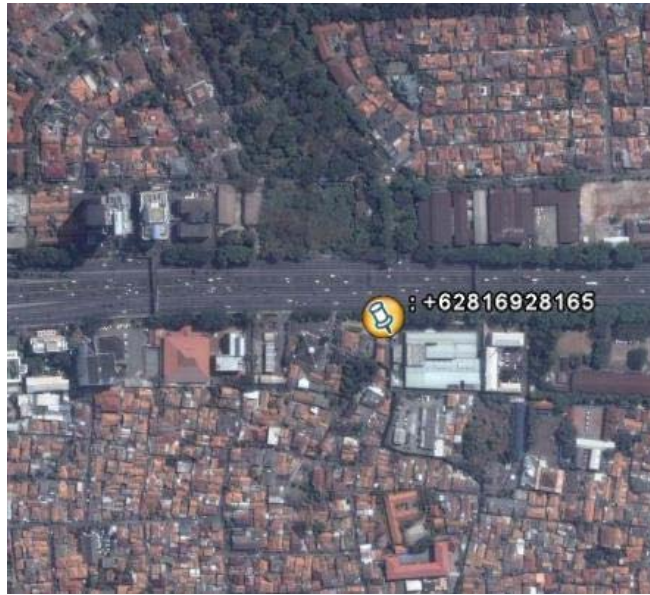
Recent Queries

Target Interrogation Successful  
510.1.1011.46812 -found valid location entry

(Target Interrogation Result Page)

- The "target" MSISDN is described in 3 data sets;
  - ENTRY – This shows the entry data used to make the query and the result category. (Target Interrogation Successful is the best result). Alternate information is returned that can include suggestions to the user to try a PSI query, if ATI does not delivery the complete results. The information will assist the user understand the result quality of the query.
  - Location Address Data – "Target located in the vicinity of....". This includes the name defined in the database of the geographical location to which BTS/Cell(center) the target is currently (or previously attached). The result denotes the TIME of the result and the PHONE STATUS, both of which provide positive indications to the current or historic status. Phone status can be IDLE (turned on and not used), IN USE (turned on and being used) or ABSENT (The phone is not logged onto any network, as per the data in the HLR).
  - Map Links – Currently two map links are provided to enable a user with internet access to link the query. These are provided with the standard implementation but with very simple customisation, links to the CLIENT's own mapping application can be achieved. Such map application could be Mapinfo. The current Google links provide a positive proof of concept. See example on the next page:

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(Google Earth© Interface)

- Longitude and Latitude are provided in the result and is the source for mapping interface. The values are digital co-ordinates.
- Telco Data includes the Home Network of the target, the Roaming (or currently active) Network, the MSC global title obtained from the query and the MSC global title name obtained from the LRTP database, the Cell Reference which provides a unique identifier which is mapped to the Cell Data in the LRTP database and provides the co-ordinate and address values, Azimuth and Radius Sector radius will be used when operator provides this cell information to CLIENT.

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### 3.2.1 FastTrax Scheduler

Selecting the Tab "Schedule" for the Scheduling functions, operators have the option to set the start and end date, the interval of location checkings, the days or the hours.

**FASTTRAX**  
GSM Location Interrogation

Thu, 06-Sep-2007 06:20 User: test Logout

Locate Schedule History

HP Number : + [ ] Alias : [ ] Query Method : ☐ ATI ☐ PSI **a**

**Recurrence # Schedule** **b**

Start Date : [ ] End Date : [ ] Repeat every... [ ] minute(s)

Between the hour(s) of : [ ] hh:mm and [ ] hh:mm

Only on these day(s) : ☐ Sun ☐ Mon ☐ Tue ☐ Wed ☐ Thu ☐ Fri ☐ Sat

Schedule Remove Clear

**Active Queries** Page(s): 1 of 22 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | Next | Last |

No	Alias	HP Number	Type	Start Date / End Date	Frequency (min)
	[ ]	+ [ ]	Search		
1	test	436645335xxx	ATI	2007-09-05 / 2007-09-06	1
2	test	436645335xxx	ATI	2007-09-05 / 2007-09-06	1
3	test	436645335xxx	ATI	2007-09-05 / 2007-09-06	1
4	test	436645335xxx	ATI	2007-09-05 / 2007-09-06	1
5	test	436645335xxx	ATI	2007-09-05 / 2007-09-06	1

Select HP Number to Open/ Edit/ Remove **c**

(FastTrax Scheduler)

### 4.2.2 FastTrax History Function

The FastTrax "History" Tab provides an easy way to find previous location queries. The ten last interrogated mobile numbers are listed already in the "Locate" Tab. However, the detailed search possibility of the History function allows to find particular previous interrogations based on criteria such as date, MISIDN or alias name.

Locate Schedule History **a**

**History..**

HP Number : + [ ] Alias : [ ]

Start Date : [ ] End Date : [ ]

Search Print **b**

Location Detail(s) **c**

(History Page)

Locate Schedule History

History..

HP Number : +  Alias :   
 Start Date :  End Date :   
 Search Print Clear

Location Detail(s)

Page(s):2 of 9 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |

No	HP Number/Alias	Location Address	Query Date Time	Entrie(s)	Latitude,Longitude
11	491724517xxx	1. GERMANY	2007-09-09 21:10	1	
12	491724608xxx	1. GERMANY	2007-09-17 01:02	7	
		2. GERMANY	2007-09-17 01:02	7	50.93,6.8491
		3. Adalbertstr. 35-10179 GERMANY	2007-09-13 00:20	4	52.5079,13.4239
		4. Beethovenstr. 30, A1, A4-50858 GERMANY	2007-09-10 20:38	1	50.93,6.8491
		5. Berlin Mitte Adalbertstr. 35 10179 Germany	2007-08-29 13:00	1	52.5079,13.4239
		6. Moenchengladbach Rheydt Scharmannstr. 1, Odenkirchener Str. 41236 Germany	2007-08-29 10:53	1	51.1609,6.4459
		7. INDONESIA	2007-08-20 17:38	1	
13	491724695xxx	1. Abu Dhabi International Airport Abu Dhabi-Area 761 U.A.E.	2007-09-09 21:30	2	24.4400,54.6240
		2. Abu Dhabi-Area 761 U.A.E.	2007-09-09 21:28	2	24.4400,54.6240
		3.	2007-08-22 16:14	5	
14	491726418xxx	1. Harkortstr., Gablonzstr.-44225 GERMANY	2007-09-12 02:15	3	51.4758,7.4429
15	491728002xxx	1. GERMANY	2007-09-10 20:07	3	
16	491731806xxx	1.	2007-09-09 21:09	1	
17	491734639xxx	1. Wuppertal Langerfeld Puelsoehde 41-42389 GERMANY	2007-09-05 23:19	1	51.2752,7.2607
		2. Germany	2007-09-05 15:37	1	
18	491762321xxx	1. GERMANY	2007-09-17 01:01	1	
		2. Hamburg AK HH-Sued A1, A255 21109 Germany	2007-08-30 15:45	2	53.5064,10.0411
		3. HamburgAK HH-SuedA1, A25521109Germany	2007-08-28 15:15	13	53.5064,10.0411
		4. INDONESIA	2007-08-20 17:36	1	

(Result from searching certain MSISDN)

Locate Schedule History

History..

HP Number : +  Alias :   
 Start Date :  End Date :   
 Search Print Clear

Location Detail(s)

Page(s):1 of 1 1 |

No	Query Date	Phone Status	HP Number/Alias	Location Address	Latitude,Longitude
1.	2007-09-13 00:20		491724608xxx	Adalbertstr. 35-10179 GERMANY	52.5079 ,13.4239
2.	2007-09-12 02:02				
3.	2007-09-05 10:02				
4.	2007-09-04 18:35				

(The details of the search result)



#### 4.2.3 FastTrax-MO Feature

**FastTrax-MO** is the name used by 1stWAP to describe the ability of a registered (white-listed, duly authorized) user to request the single entry location query of a particular MSISDN from his/her mobile GSM device. The system receives and logs the requests initiated directly from the **FastTrax** application (via Internet/Intranet) and the **FastTrax-MO** (via SMS) from a registered (qualified) mobile in the same way. The reports of all queries are available in the *FastTrax MO Admin* application. The creation and configuration of a new user for either **FastTrax** or **FastTrax-MO** is through the *FastTrax MO Admin* application.



(Example of received location information on a mobile device)

#### 4.2.4 FastTrax MO Admin Application

The FastTrax MO Admin application provides a web-based interface to administrate platform users and user authorizations, incl. white listing of mobile GSM devices for MO location queries, i.e. location tracking of targets via the mobile device of CLIENT's operators/field personnel. Furthermore, it allows to blacklist certain MSIDNS so that these blacklisted MSIDNS cannot be tracked/located by the users of the systems (e.g. to protect the privacy of certain individuals). Another important monitoring and supervision feature is the Location Request History, with which an Administrator can monitor the location checking activities of his operators.

The screenshot displays the FastTrax MO Admin Application interface. At the top, there is a header with the 'FASTTRAX' logo and the text 'GSM Location Interrogation'. Below the header, a status bar shows the date and time 'Thu 15-11-2007 14:29:34' and the user 'User: test'. A 'Logout' button is visible in the top right corner. The main navigation bar includes tabs for 'User Administration', 'Blacklist Administration', 'Location Records', and 'Admin'. The 'Location Request History' section is active, showing a table of location requests. The table has columns for 'Date/Time', 'Target', 'User', 'Location Result', and 'Details'. Below the table, there is a pagination control showing '1 2 3 4 5 6 7 8 9 10 11 12 13'. The interface also includes filters for 'User', 'Type', 'From', and 'To', along with 'Download' and 'Display' buttons.

Date/Time	Target	User	Location Result	Details
2007-11-15 14:23:00	6285691053710	FT_test	Jakarta -MJK14(3G) Jl. Kapt. Tendean 24, ^Radiant ~Kec. Mampang Prapatan, Kel. Pela Mampang ~Jakarta - 12720~INDONESIA	more
2007-11-15 14:22:00	628179717471	FT_test	+62818445615 INDONESIA	more
2007-11-15 14:22:00	6281510068101	FT_test	Jakarta -MJK04 INDONESIA	more
2007-11-15 14:21:00	4237918499	FT_test	+919814797098 INDIA	more
2007-11-15 14:20:00	628179811155	FT_test	Jakarta INDONESIA	more
2007-11-15 13:35:00	628568575854	FT_test	Jakarta -MJK04 INDONESIA	more
2007-11-15 13:34:00	628551128551	FT_test	???	more
2007-11-15 13:33:00	628568575854	FT_test	Jakarta -MJK04 INDONESIA	more
2007-11-15 13:33:00	447767771521	FT_vincent	+447785012400 UNITED KINGDOM	more
2007-11-15 11:56:00	62818868800	FT_test	Abu Dhabi UAE	more
2007-11-15 11:42:00	628568575854	FT_test	Jakarta -MJK04 INDONESIA	more

(Location Request Page)



### Location Request Detail

Parameter	Value
Target :	628562156794
Date / Time :	2007-09-13 17:33:11
Requesting Handphone :	FT_simu_admin_ftx
Password :	
SMS Request Text :	
Location Request Authorization Status :	Authorized
IP Address :	
Request Virtual Number :	
Country :	Indonesia
Operator :	Indosat-IDNSL
MSC Name :	Bandung -MBD03
Cell ID :	510.1.10250.13305
Destination HP State :	Hand Phone turned on
Age of Location :	1
Latitude :	-6.1815
Longitude :	106.9081
Cell Radius :	-1
Cell Radius Start Angle :	190
Cell Radius End Angle :	0
Cell Gravity :	unsupported
Cell Text Description :	JAKARTA-TIMUR INDONESIA
API Message ID / Error Code :	
GSM Location Type :	Type Zero
Location SMS Text :	
Location SMS Result Delivery Status :	

Cancel

(Location Request Detail Page)

## 4.3 Multiple Targets and Periodic Location Checks (FTrax)

Unlike FastTrax (single number, current location), the **FTrax** application allows for a complete management of multiple targets (GSM and GPS based) and ability to perform and report user-defined, automated periodic location checks. This allows the operator to define a target and define the time interval that the system will automatically perform a location check. Each check will be logged in a report available to be viewed on screen or downloaded for later data mining, archiving, integration with other data, resorting, etc. Further advanced system features such as vicinity alert (2 targets are in close proximity to each other) are currently in development.

The Reports generated and all user Location Requests are also logged in the system audit logs which provide a means of applying controls on system usage and system generated reports.

The basic process is as follows:

- The “target” must be registered in the system as a “traceable entity” object.
- The object is marked as “Locate” and the current location data is retrieved from the GSM network either; (1) One-off, meaning current location or (2) marked for tracking for set length of time where periodic queries run for a defined period.
- The system receives and processes the data. This variable information is merged with fixed infrastructure locations.
- The web application displays the “target”, respectively its GSM Cell (or GPS) location on suitable digital maps. (see Fig 1) Besides the “graphical” display, the option to view textual detail also exists. The operator can drill-down to lower level maps as far as available and whenever appropriate. (see Fig 2)
- The authorized officer will manage the target and the information distribution.
- The maps and supporting detailed information, including history through animation, can be viewed via encrypted IP connection.
- Updates can be further distributed to (authorized) staff via SMS, which can display the textual data. This can be updated at periodic intervals as defined.

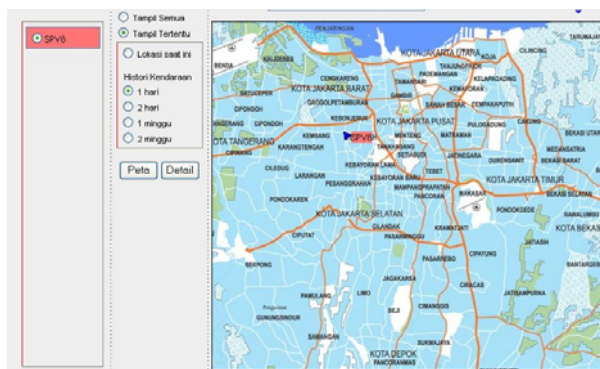


Fig. 1

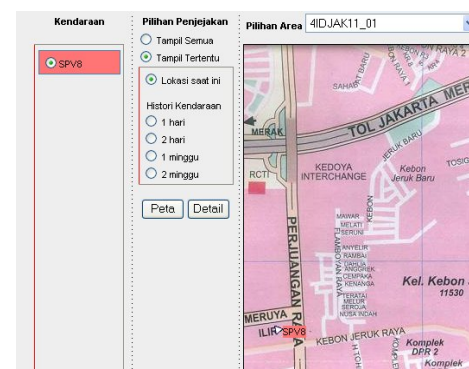


Fig. 2

Naturally the process described can be expanded to various permutations based on requirements. The basic concept is that a TARGET, respectively its GSM Cell location is defined and overlaid as spatial data on a digital map plus available in text detail. The database can maintain historic records of periodic updates and replay these as required and also to provide detailed audit logs. Update locations can be automatically dispatched externally from the platform, as required, to limited (authorized) distribution list by various media, primarily as SMS. Equally, an incoming SMS query from a “white-listed” hand-phone can also trigger a target interrogation, plus response, supported by activity audit trail.

## 4.4 Mapping

The platform has a method to implement various map formats, with digital maps being the most ideal although not mandatory. The database contains various maps (as needed by the user) to overlay the target location. Maps can be “photo” type such as Google Earth, other satellite or aerial images; they may be “street-directory” style displaying street names and other landmarks. The platform is capable to utilise any map, which acts as the under-layer to provide graphical identification suitable to the user. CLIENT must provide maps with at least 2 GPS reference points for further processing and implementation in the platform.

Depending on the zoom level maps with different scales are displayed. During system planning it has to be agreed which and how many different scales and maps shall be used (See also Pricing Notes in the Commercial section). Maps have to be provided by CLIENT prior to LRTP installation. Optional a map administration tool with map administration training can be provided.

For each level of map:

- All Maps in level must have longitude and latitude coordinates annotated clearly around the edges of the maps (minimum longitude and latitude for top left and bottom right positions. These coordinates will be used in the calibration of the system)
- Either 1 file containing a map with the whole of that level OR
- Multiple files containing map parts for a level
- Map format should be in jpeg format (or similar format that can be converted into jpeg format using Photoshop©, freehand or similar product)
- If map is not in jpeg format, or a format which can be imported into Photoshop, the name of the system used to create the map should be provided, and if possible an installable copy of the software (plus license details) should be included with the map delivery



Maps can be delivered to 1stWAP electronically - email, FTP, CD Rom, Flash Drive - or by courier.

The supply of maps is the responsibility of CLIENT. 1stWAP shall undertake the calibration and installment into the LRTP based on the offering.

## 4.5 LRTP Suite Special Features

### 4.5.1 SMS Broadcast (MobileBroadcast)

The platform has the capability to be enabled (as an option) as a carrier-grade SMSC. This will naturally be dependant on CLIENT's agreement with Host Operator allowing such capability, but the platform can enable the CLIENT to send high volume and priority SMS to its permitted community. This powerful tool will

enable CLIENT's organisation to send SMS to a large number of people extremely quickly. (System configured with 4 x E1 Timeslots, with each link capable of up to 10 sms/sec, resulting in up to 2,400 SMS per min or up to 144,000 SMS sending per hour). We call this facility MobileBroadcast.

#### **What is MobileBroadcast:**

This facility provides a 2-way inter-active SMS messaging facility that utilizes SMS as the means of communication. It is, in short, a carrier-grade SMS - Send and Receive facility.

The primary benefits to CLIENT of this module is that it requires very little training, is very simple and intuitive to use. This powerful communication tool with high throughput performance empowers CLIENT to reach 10's of thousands of people in a matter of minutes.

#### **Primary Features;**

- Send a single message (SMS) to a single number or broadcast a message to thousands of people
- You have options of manually entering the destination number(s), selecting from your stored numbers in the application's Phone Book or importing a list of numbers from an offline database. (csv file import)
- You have options of sender identification; either a name, e.g. " CLIENT-ABC ", or a long "virtual" number to which people can reply or send to.
- All replies or messages sent to your "Virtual Number Range" can be viewed from the web application, they can be received in massively high volume with no congestion, no "memory full", always available. (see "What are Virtual Numbers" below)
- Virtual Number replies can be subsequently downloaded for further sorting or reprocessing.
- Provides detailed Delivery reports for all messages sent so you can identify clearly if your message was received or not (and specifically, why not!)
- You can send messages "immediately" or schedule them for a specific time in the future.
- Your messages can be "personalized" with recipients name in the same batched broadcast.

#### **What are Virtual Numbers and how do they benefit CLIENT?**

The LRTP iSMSC will be configured with a Global Title (GT) and National Pointcode (NPC). Additionally, it is suggested that CLIENT requests the Host Operator to allocate a number block (assigned to virtual HLR in the 1stWAP Messaging Node). This will take the form of a number range to which the LRTP can utilize as Virtual Numbers. The system can SEND messages from these numbers and replies or SMS-MO can be RECEIVED and processed by the system. The iSMSC is therefore a "supper sender and receiver" of SMS. Virtual Numbers can be used by the CLIENT for several purposes but primarily as MSISDN that are terminated in the system rather than into a SIM card. SMS received to Virtual Numbers can be configured such that they can be;

- Redirected into the MobileBroadcast application and become "machine terminated" and read through the application and later stored;
- Automatically replied to with some custom applications (not included in standard LRTP offering) such that senders can be provided with SMS feedback. Presume this to be similar to "fax-back" services except where SMS is the communication medium.
- Allocated to various application that can be created for CLIENT (not included in standard LRTP offering) such as "hiding" the sender but allowing bi-directional messaging.

- Provides anonymous sender capability most suitable CLIENT staff, who do not want to give up a personal number but hide their identity. Staff of the CLIENT could be allocated a “Virtual Number”, which is mapped to his active number. This virtual number can remain static whilst the active number could be interchangeable. All SMS received could be redirect to the staff. The facility could allow CLIENT staff to also send SMS from his active phone and it will appear to come from his virtual number on the receivers phone.

#### **4.5.2 SMS Spoofing – Pretend to be Someone Else**

The platform has the capability to “spoof” a sender ID on SMS. This means that CLIENT will have the ability to “pretend” to be another party. Such SMS sender spoofing techniques have been already successfully used to trap, mislead, or to confuse targets. As a tool in anti terrorism, the LRTP can enable CLIENT to send SMS to target to whom it seeks to manipulate their communication by assuming the identity of another to whom they may trust. An example of this might be to send a message to one or more targets using the actual phone number of another in their group. This information may be to fool the recipient to go somewhere or do some action to which allows CLIENT to capture, identify, extract information from targets or similar. In summary, it provides the capability of impersonating another person through SMS.

### **4.6 Connectivity with Local GSM Service Providers**

The platform requires a SS7 connection with at least one GSM Service Provider that has inter-working relationship with other relevant GSM Service Providers in the area to be covered. The platform requires the interrogation of the target entity’s HLR, VRL & MSC. The platform requires constant availability to make such interrogation.

The platform interrogates the GSM Network provider(s) network infrastructure based on standard GSM (ETSI) implementations of HLR, VLR and MSC. If a GSM Network provider has non-standard GSM (ETSI) implementations of the above mentioned network components installed in his network, CLIENT has to provide the respective information to 1stWAP prior to system installation and 1stWAP will investigate whether and how such a non-standard implementation can be accommodated. Dependent on the required effort, such a specific development can be subject to additional costs (See also Pricing Notes in the Commercial section).

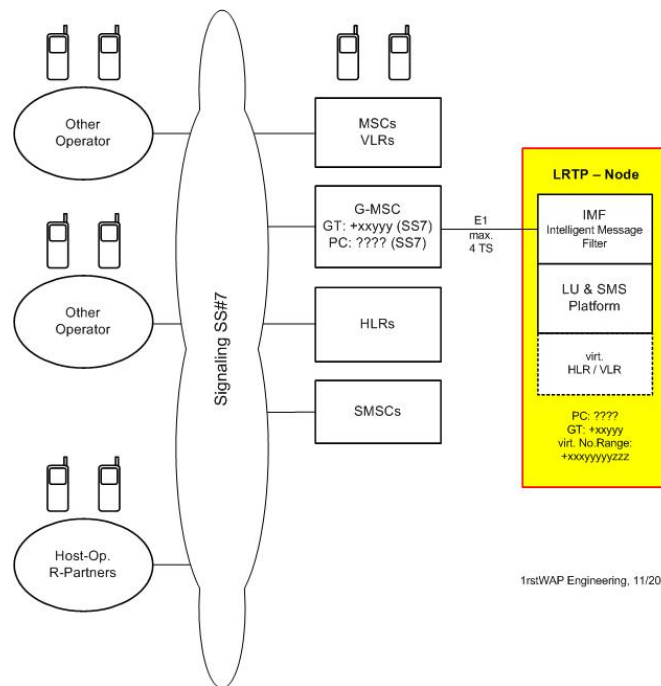
It is assumed that CLIENT has the authority and mandate to request such permanent access from the primary Host Operator, to which the special equipment is connected, and the rights to interrogate the other GSM Operators’ mobile devices.

The LRTP will be located in a secure environment within the CLIENT’s Site Location. CLIENT need to ensure that 1stWAP can install and as far as required and agreed remotely maintain the LRTP. All the GSM Service Providers also need to include the global title (GT) of the platform’s iSMSC into their SMSC white-list to permit legal and controlled HLR interrogations. (ITU standards – IR.21 document)

See also Pricing Notes in the Commercial section: CLIENT remains responsible for any charges imposed from any of the GSM Operators in connection with SS7 and IP connectivity, cell data provisioning and SMS traffic consumed by CLIENT. The assumption is that CLIENT has an existing agreement with operator(s) for the purpose of GSM interrogation. The iSMSC is therefore provisioned under contract between the Host Operator and CLIENT and hence, 1stWAP is the nominated “Operational Service Facility” on behalf of CLIENT.



## Schematic showing relationship between SS7 system components



## 4.7 Access to Location Data outside Client's Country

The L RTP will enable CLIENT to interrogate the SS7 network location information of any MSISDN of the Host Operator or ANY operator with whom the Host Operator has an SMS interworking agreement with (basically, any network where a subscriber of the Host Operator can send an SMS) and that has not blocked the Host Operator in regard to PSI and/or ATI interrogations. As such, a location query could be effected on a MSISDN of a target outside the home country of CLIENT and Host Operator. It can be assumed that a result could provide a specific MSC but not the "physical location". It could be that this information is required by CLIENT and is not available through information supplied from the Host Operator, and CLIENT does not wish to make it known to the Host Operator of such query. 1stWAP risk mitigation can be an optionally procured service used to define the problem through relationship networking. Specifically, 1stWAP can apply discretion and stealth to try to obtain information directly from specific GSM operators that is normally NOT provided to 3rd parties, even though it is not actually commercially or technically sensitive. Also, 1stWAP have the potential to obtain the information via a query using our own commercial nodes and other commercial Location Based Solution (LBS) business. Thus, we can seek the answer from various sources which may not be available to CLIENT who have the limitation of a single (L RTP) node. Currently, 1stWAP maintains a MSC database of ca. 16.000 MSCs in ca. 158 countries of which ca. 4.000 MSC locations are known to 1stWAP through its commercial activities. The MSC database entries are continuously improved and enlarged. Assumptions are made on the coverage area of a MSC based on usual MSC coverage ranges. 1stWAP does not guarantee location information of remote area MSCs and MSCs still unknown to 1stWAP. Furthermore, 1stWAP's commercial activities enable it to maintain and enlarge its own Cell Data database in several countries. A list of countries with MSC data availability can be provided on request.

Such “service” can also be applied to other Telco Related Anomalies (primarily outside the sovereign country):

Situations may exist where it becomes necessary for CLIENT to understand whether an operator outside the sovereign country has already implemented ATI, and where they have, whether they have implemented “white-listing” (allowing specific SMSCs) or “black-listing” (preventing specific SMSCs) which prevent the expected result from being made available. 1rstWAP risk mitigation can be the service to be used to define the problem through relationship networking. Specifically, and as mentioned above, 1rstWAP can obtain information from many GSM operators through personal / professional relationship links, discretion and stealth.

In countries where number portability exists, and the desired result is not provided, CLIENT will may need to at least contact CLIENT’s peer organization to determine definitive location. The primary variable will be “which operator” to contact. (1rstWAP risk mitigation can be the service used to define the problem through relationship networking. It may be possible through 1rstWAP’s own nodes to determine an answer and if required, to make requests through social channels to define the carrier to which the MSISDN currently belongs and subsequently define the location). Specifically, and as mentioned above, 1rstWAP can obtain information from many GSM operators through personal / professional relationship links, discretion and stealth.

The incidence where CLIENT is able, due to favourable circumstances, to make direct contact with an operator, the problem will be to determine the most direct path to the relevant engineering manager to contact at the relevant operator.

1rstWAP can provide a risk mitigation service which can be the service used to assist CLIENT to define mobile operator problems through relationship networking. Additionally, information such as location data that 1rstWAP owns in its own database (NOT related to any other LRTP client) can be made available to CLIENT to supplement their database. As each client will have varying needs and capabilities, this sensitive issue can never be distinctly defined in this proposal and can be included after detailed discussions with CLIENT at the appropriate time.

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